

# Moral Development of Senior High School Students in Physics Learning Based on Traditional Game

Himawan Putranta<sup>1\*</sup>

<sup>1</sup>Department of Physics Education, Faculty of Tarbiyah and Education, Universitas Islam Negeri Sunan Kalijaga, Yogyakarta, Indonesia.

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Corresponding Author:

Himawan Putranta

[himawan.putranta@uin-suka.ac.id](mailto:himawan.putranta@uin-suka.ac.id)

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**Abstract:** Physics learning is carried out to develop students' cognitive, psychomotor, and morale. This phenomenological research aims to explore the moral development level of senior high school students in physics learning based on traditional games during Covid-19 pandemic. The research data were collected through in-depth interviews with eight physics teachers and eight senior high school students. The participants were selected using a purposive sampling technique. Data analysis uses analytic reduction which begins to identify important statements from interview results, determine core theme, and interpret interview results' essence. The research results found that physics learning in senior high schools during Covid-19 pandemic was integrated into traditional games. The student's moral development in physics learning-based on traditional games at second, third, fourth, and fifth levels. Moral development at the second, third, fourth and fifth levels sequentially is shown by the willingness to take part in physics lessons to move up grades, facilitate the application of physics concepts, explore abilities, and integrate physics learning into daily activities. It takes high-quality teachers and complete distance learning facilities so that students can optimize their moral development.

**Keywords:** Covid-19 pandemic; Distance learning physics; Moral development; Traditional games

## Introduction

The Covid-19 pandemic that occurred affected all activities of human life including learning activities. Learning was originally carried out face-to-face, but with Covid-19 pandemic, learning was carried out remotely. This certainly has an impact on students' intellectual and moral development. Many students complained about the implementation of distance learning during Covid-19 pandemic (Churiyah et al., 2020). What's more, some subjects are considered difficult for some students such as physics (Fakcharoenphol et al., 2015). Physics is a branch of natural science that explores physics phenomena that occur in life (Bejan, 2016). Therefore, it is necessary to pay attention to physics phenomena that occur in life and good mathematical abilities. This is because physics phenomena that occur in life are easier to use using mathematical equations (Veloo et al., 2015). Students feel

physics is difficult because they must have mathematical abilities. The reasons expressed by students were also by findings of PISA (Program for International Student Assessment) in 2019. The scientific literacy skills of Indonesian students in 2019 were ranked 70th with an average score of 396 below average PISA score (O.E.C.D., 2018). Therefore, students must study even harder, considering that distance learning physics is not guided by teacher face-to-face.

Students need to practice applying physics concepts that have been learned to solve physics problems in printed books and problems in life continuously. This step is effective in making it easier for students to understand physics concepts (Moser et al., 2017). However, learning physics concepts certainly requires direct guidance from teachers or people who are more competent. If there is no direct guidance from a teacher or someone more competent, there will be misconceptions among students (Foisly et al., 2015).

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Furthermore, misconceptions are problems that are often experienced by students in learning physics. Students often experience misconceptions about several physics' subjects. Misconceptions in students can occur because students interpret physics concepts incorrectly. Teachers who teach physics concepts incorrectly can also cause misconceptions in students. Besides, learning physics during Covid-19 pandemic was carried out remotely, causing opportunity for misconceptions to be even greater (Suprpto, 2020). In distance learning physics, sometimes teachers explain physics concepts less deeply (Erman, 2017). This has become one of emergences of student's misconceptions on distance learning physics during Covid-19 pandemic.

The low digital literacy skills of teachers and students cause obstacles in distance learning physics (Jan, 2018). Teachers and students who are accustomed to face-to-face learning must be forced to do distance learning by mastering supporting technology. Besides, not all students have facilities that support distance learning physics. Many students take distance learning physics by borrowing supporting equipment. Not a few students also have to climb house roofs to take part in learning physics. This is due to uneven internet network in Indonesia (Sujarwoto et al., 2016). Besides, distance learning physics also affects students' moral development. Students are more concerned with themselves in distance learning physics (K. Lee et al., 2019). Distance learning physics that requires digital literacy skills can also hurt students' morale (Naziah et al., 2020). Students with a high interest in knowledge sometimes take advantage of internet services to look for things that are not appropriate. Students sometimes open and view prohibited pornographic sites (Martyniuk et al., 2016). Students do not consider actions they do good or bad. Therefore, distance learning physics during Covid-19 pandemic also affected students' moral development.

The students' moral development in distance learning physics is often ignored by teachers. Most teachers only prioritize students' cognitive development (Cebrián et al., 2015). The students' moral development is no less important than cognitive development. Moral development can influence behavior and attitudes shown by individuals (Kim et al., 2017). Furthermore, individual decision making is influenced by moral development. If the individual makes decisions for benefit, then his moral development is low. Meanwhile, individuals who make decisions by paying attention to applicable rules, prioritizing common good, and providing alternative solutions, the individual's moral development is at a high level (Garrigan et al., 2018). Furthermore, distance learning physics that is carried out online sometimes hurts students' moral development. Students can access various kinds of

forbidden sites that cause their moral development to be disturbed (Parker III et al., 2016). The fading of noble values inherited from previous generations causes students to have low moral quality. The students' low moral development in distance learning physics is due to a lack of social interaction (Pan et al., 2018). The students' moral development is not only determined by age but is determined by individual considerations in carrying out their activities (Zhang et al., 2017). Therefore, it is necessary to have parental guidance in implementing distance learning physics. Teachers need to innovate in overcoming problems of students' cognition and moral development in distance learning physics.

One of the innovations made by teachers in overcoming problems of cognition and moral development in distance learning physics is to vary learning model that is students centered. The learning model that is student centered can provide flexibility for students to explore cognitive abilities and moral development to the fullest (E. Lee et al., 2016). Besides, student-centered learning provides a longer time for students to understand physics concepts (Mihardi et al., 2013). Therefore, through a student-centered learning model, it is expected to increase students' enthusiasm in learning physics concepts. Teachers can innovate distance learning physics by integrating it into their daily activities. By integrating physics learning into daily activities, it is hoped that it can make it easier for students to understand physics concepts. Distance learning physics that is integrated into daily activities of students can be done based on traditional games. The reason for using traditional games in distance learning physics is because traditional games contain physics concepts. As in bamboo shooting game, there are Newton's laws of motion, momentum and impulse, pressure, force, and gases kinetic theory (Sari et al., 2020). Besides, traditional games are activities that are popular with students. Learning that is integrated into activities that are popular with students can increase students' conceptual understanding. Traditional games can optimize students' moral development including emotional management (Din et al., 2018). Besides, traditional games can develop students' moral values including decision making, strategy determination, loyal friends, and mutual respect (Aminin et al., 2018). Thus, traditional games can not only help students understand physics concepts but can help optimize moral development.

Based on the problems previously described distance learning physics during Covid-19 pandemic affected students' intellectual and moral development. One of the efforts to overcome this problem is by integrating physics learning into traditional games. Parents also need to guide the implementation of

distance physics learning. Thus, the questions to be answered in this research are as follows: What is the physics learning based on traditional game strategy during Covid-19 pandemic to overcome low moral development of high school students? What is the level of moral development of high school students in physics learning based on traditional games during Covid-19 pandemic?

## Method

### General Background

This research is qualitative research with a phenomenological method. This research was conducted to explore the level of moral development of high school students in traditional game-based physics learning during Covid-19 pandemic. Besides, this phenomenological research also aims to find out teacher's strategy in learning physics based on traditional games during Covid-19 pandemic. This traditional game-based physics learning strategy is carried out to overcome low moral development of high school students. This research was conducted for two months from November to December 2020. This research is expected to be a guide in conducting further research, especially in the theme of research on students' moral development, learning physics during Covid-19 pandemic, and learning physics based on traditional games.

### Participants

Participants involved in this research were physics students and teachers at public high schools in Yogyakarta, Indonesia. Given many public senior high schools in Yogyakarta, the determination of participants in this research used a purposive sampling technique. The purposive sampling technique is a technique used in taking research participants which is not random, but participants are drawn based on certain criteria (Klar et al., 2019). The criteria determined in taking participants were eleventh-grade students who were taking distance learning physics based on traditional games. The physics teachers involved in this research are physics teachers who teach in public high schools who integrate physics learning into traditional games. Furthermore, the participants involved in this research were eight physics teachers and eight high school students in Yogyakarta. Participants came from four public senior high schools in Yogyakarta. In other words, every public high school was chosen by two eleventh grade students and two physics teachers who carried out physics learning integrated into traditional games. The selection of participants in this research was based on provisions stating number of participants allowed in phenomenological research, namely 3 to 20

heterogeneous participants (Vagle, 2018). In taking participants from four-state senior high schools in Yogyakarta, participants from different genders were also drawn. This means that every single senior high school participant is selected from one male participant and one female participant. Meanwhile, the profile of participants involved in this phenomenological research can be seen in Table 1.

**Table 1.** Participants Profiles in the Phenomenological Research

No.	Name	Affiliation	Profession	Gender	
				Male	Female
1.	SFA	PSS-1	Student	1	-
2.	SWA	PSS-1	Student	-	1
3.	SFB	PSS-2	Student	1	-
4.	SWB	PSS-2	Student	-	1
5.	SFC	PSS-3	Student	1	-
6.	SWC	PSS-3	Student	-	1
7.	SFD	PSS-4	Student	1	-
8.	SWD	PSS-4	Student	-	1
9.	TFA	PSS-1	Physics Teacher	1	-
10.	TWA	PSS-1	Physics Teacher	-	1
11.	TFB	PSS-2	Physics Teacher	1	-
12.	TWB	PSS-2	Physics Teacher	-	1
13.	TFC	PSS-3	Physics Teacher	1	-
14.	TWC	PSS-3	Physics Teacher	-	1
15.	TFD	PSS-4	Physics Teacher	1	-
16.	TWD	PSS-4	Physics Teacher	-	1

*Note: participant's number was 16 participants*

Based on Table 1, shows that all participants and affiliations involved in this phenomenological research are anonymized or marked by using initial names. This is done to protect confidentiality of participants and affiliates. Besides, giving each participant and its affiliates initial names also aims to maintain confidentiality of information obtained. Participants involved in this research used their initial names that were disguised, including SFA, SWA, SFB, SWB, SFC, SWC, SFD, SWD, TFA, TWA, TFB, TWB, TFC, TWC, TFD, and TWD. Besides, the affiliation of each participant was also disguised, consisting of PSS-1, PSS-2, PSS-3, and PSS-4. The selection of participants from four-state senior high schools was carried out because these four-state senior high schools were ranked in the top five as the best schools in Yogyakarta.

### Instruments and Procedures

Data collection in this research was carried out using in-depth interview techniques. To obtain quality interview results, interview guidelines were presented and recorded in the interview process (Miles et al., 1994). The questions posed to participants are open and general designed to explore phenomenon of students'

moral development in traditional game-based physics learning in high schools during Covid-19 pandemic. Interviews are conducted for forty to sixty minutes. Interviews were conducted wherever agreed by participants by applying the health protocol. Interviews are conducted in a conducive atmosphere, so that participants can answer questions posed freely and comfortably. Meanwhile, some participants did not wish to be interviewed directly, so interviews were conducted by telephone. An interview guide that contains a list of questions, sent to participants to answer online. Furthermore, in in-depth interviews, two interview guides were also compiled which contained a list of questions that were answered by each physics student and teacher. The interview guide used to interview students and physics teachers each consisted of eleven questions. The interview guide used to interview students includes questions about traditional game-based distance learning experiences.

The first question that is asked of students contains questions such as name, area of origin, and learning experience from distance and face to face. The next ten questions are the main questions of this research. Do the other ten questions include whether you have been participating in distance learning physics? Have you ever taken face-to-face physics lessons? What do you think about implementation of face-to-face physics learning? Is it easier to understand physics concepts through distance learning or face-to-face learning? Are you more excited about taking part in distance learning physics than face to face? How should physics learning be done so that you can easily understand physics concepts? Do teachers provide innovations in distance learning physics? Is your distance learning physics based on traditional games? How do you think about traditional game-based distance learning physics? Is it easier to understand physics concepts through traditional game-based physics learning? Furthermore, the interview guidelines used to interview physics teachers included questions about traditional game-based distance learning strategies.

The first question asked of physics teacher contains questions such as name, length of teaching, and teaching experience. The next ten questions are the main questions of this research. As for the other ten questions, what are your distance learning strategies for physics? Are you integrating traditional games into physics learning? What is the strategy for integrating traditional games into physics learning? What subjects of physics are integrated into traditional games? What traditional games have you integrated into learning physics? What learning models do you use in integrating traditional games into physics learning? How do students respond to participating in distance learning physics? How do students respond in following physics learning that is

integrated with traditional games? Is there a solution given by students in carrying out distance learning physics? How is students' moral development in distance learning physics integrated with traditional games? The collected interview data was then analyzed using an analytical reduction method.

#### *Data Analysis Technique*

Before analyzing the data, the data obtained was tested for validity and reliability. The validity test was carried out by re-clarifying data that had been obtained from participants. The reliability test was carried out by asking participants again the questions in the interview guide at different times. If data obtained in validity and reliability tests are the same as data obtained during the first interview with participants, the data obtained will be valid and reliable. After the data obtained is valid and reliable, the next step is to analyze data. Analysis of data used in this research using analytical reduction method. The stage of analytic reduction begins with identifying important statements from interview results, determining core theme according to interview results, and interpreting essence of interview results (Creswell et al., 2017). The point of essence interpretation is to deeply interpret phenomena experienced and participants' response in dealing with these phenomena (Vagle, 2018). The data analysis procedure begins with converting the voice recordings into a transcript of interview results. Next, read the interview results transcript repeatedly. Simultaneously with these stages, the main theme in interview results transcript was selected to become main statement. Next, group main statements into a central theme. Compile textural descriptions that contain descriptions of phenomena experienced by participants based on main statements and central themes. Apart from compiling textural descriptions, structural descriptions are also arranged based on main statements and central themes. The structural description contains a description of a participant's response in overcoming phenomenon. The last stage of analytic reduction is interpreting interview results essence. The essence interpretation carried out in this research is combination of textural and structural descriptions that give a deep meaning to interview results.

This phenomenological research method can be arranged in a scheme that facilitates the process of interpreting this research. The phenomenological research method scheme can be shown in Figure 1.

Based on Figure 1, it is shown that this research was conducted to explore traditional game-based physics learning strategies during Covid-19 pandemic to overcome low moral development of high school students. This research also aims to determine students' moral development level in learning physics based on

traditional games during Covid-19 pandemic. This research was conducted by interviewing eight physics teachers and eight students from four public high schools in Yogyakarta. The interviews result with the participants were analyzed using analytic reduction. It is through this analytical reduction that strategies of high school physics teachers and students' moral development level of students in learning physics based on traditional games during Covid-19 pandemic can be known.

learning strategy of physics by integrating it into traditional games. TWA said that *"I explain physics concepts to students based on traditional games. The traditional game I use is bamboo shot which can be used to explain concepts of pressure, sound, gases kinetic theory and fluids. I teach traditional game-based physics to students using inquiry and problem-based learning models"*.

Distance learning physics in high schools during Covid-19 pandemic needs to be mentored by parents. This is done so that students focus on learning and do not open prohibited sites on the internet. This is by TWB's argument that, *"I received reports from parents that students were caught accessing pornographic sites during remote physics learning. They do not consider what they have done is good or bad. They reasoned to treat their curiosity to something they had never known"*. Distance learning physics does not always have a positive impact on students. This is by statement of physics teacher previously explained. The negative impact of distance learning physics is due to students experiencing limitations in socializing with their friends due to Covid-19 pandemic. This is consistent with TFB's argument that, *"Even though I integrated distance learning physics into traditional games, students couldn't socialize directly with their friends. This sometimes causes students to be selfish"*. Even so, distance learning physics must still be done if Covid-19 pandemic is not over. This was done to curb Covid-19 spread.

Distance learning physics sometimes experiences several obstacles in its implementation. Obstacles to distance learning physics arise from physics teachers and students. Teachers and students who are accustomed to face-to-face learning must adapt to distance learning which demands rapid mastery of technology. This is what sometimes becomes an obstacle to implementation of distance learning physics. Furthermore, TWC said that *"The students and I must adapt more quickly to technology that supports distance learning physics implementation. This is done so that distance learning physics can be carried out according to a plan that has been prepared. Even though learning is done remotely with the help of technology, my physics learning is integrated into traditional games. I do this because traditional games can optimize students' emotional management"*. One of the reasons that distance learning physics is integrated into traditional games is to preserve these traditional games. Besides, in traditional games some values support optimizing students' moral development. This needs to be instilled in students because the more often students interact with technology, the more existing noble values will fade away. This statement is based on arguments presented by TFC. TFC said that *"When I taught distance physics there were some students who complained about implementation of this learning. They complain without providing alternative solutions so that distance learning*

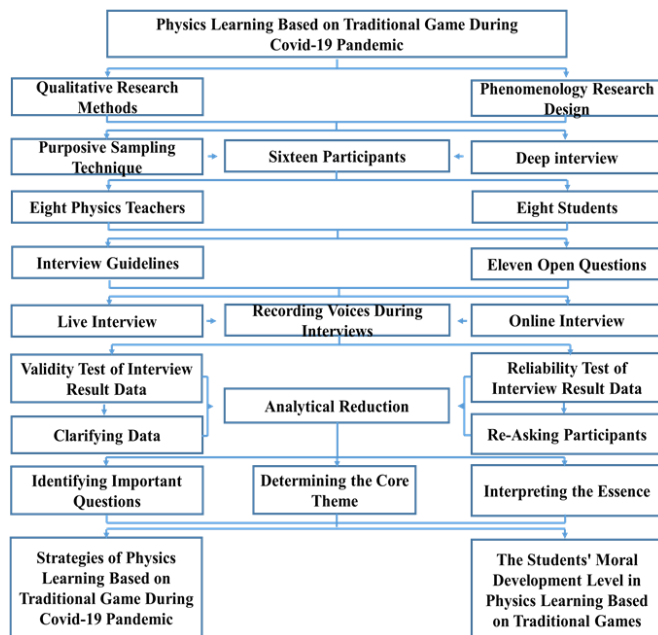


Figure 1. The schematic of phenomenological research method

## Result and Discussion

### Result

#### Strategies of Physics Learning Based on Traditional Game during Covid-19 Pandemic

The implementation of physics learning needs to be done by integrating it into life. This is done because physics is one of the natural sciences that examines phenomena of physics in life using mathematical equations. Furthermore, distance learning physics during Covid-19 pandemic gave students flexibility to explore physics phenomena that occurred around their lives. One of the physics phenomena in life that can be explored by students to apply physics concepts is through traditional games. Therefore, a physics teacher strategy is needed in carrying out traditional game-based physics learning during Covid-19 pandemic. The results showed that the strategy of physics teachers in each high school in learning physics based on traditional games was different. TFA said that *"I ask students to be more active in practicing applying physics concepts in life. However, students are more concerned with themselves than their friends and groups"*. TWA undertakes a distance

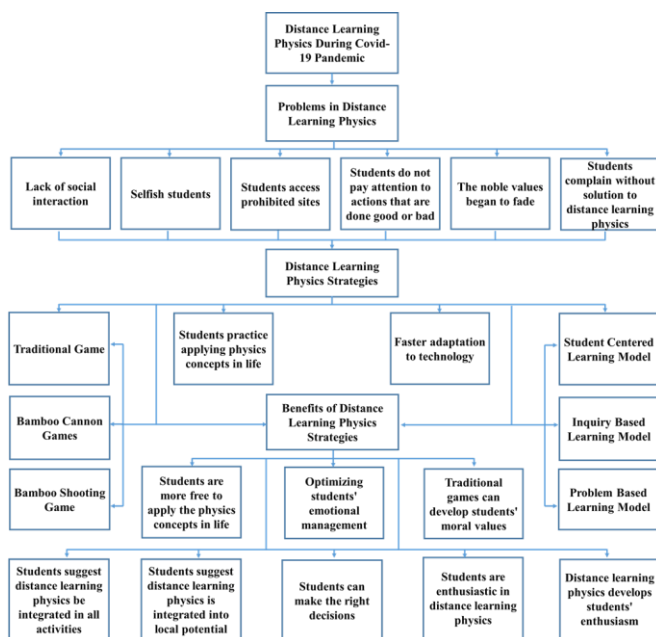
physics makes it easier to learn physics concepts. The attitudes shown by students showed noble values passed down from previous generations by students”.

The moral development shown by students can be improved so that it is by proper stages of moral development. This is by previous teacher's statement that students’ moral development can be trained through integrated learning in life including traditional games. This is by argument presented by TFD that, “Physics learning integrated into bamboo cannon game can train students in making decisions appropriately. In my opinion, traditional games can develop various students’ moral values, including friend loyalty and mutual respect”. However, some teachers convey their experiences in conducting distance learning physics that some students have achieved higher moral development than other students. This was conveyed by TWD that, “Distance learning physics provides a different experience to my students. They feel more flexible in exploring their abilities. Distance learning physics that I did foster students’ enthusiasm to explore physics concept. Students are enthusiastic about taking distance learning physics which is integrated into traditional games. Besides, some students suggest distance learning physics is not only integrated into traditional games, but into local potential and all student activities”. This shows that implementation of physics learning based on traditional games affects students’ moral development in dealing with problems that occur. Thus, strategies of physics learning based on traditional game during Covid-19 pandemic can be organized into a scheme as shown in Figure 2.

Based on Figure 2, it is shown that traditional game-based physics learning strategies in high schools during Covid-19 pandemic were carried out by integrating into traditional games and implementing a student-centered learning model. Besides, distance learning strategies are carried out by practicing adapting to technologies that support distance learning physics. Students are required to practice applying physics concepts in solving physics phenomena that occur in life continuously. This strategy is carried out to optimize students’ ability to explore and apply physics concepts in life. Furthermore, distance learning physics is carried out by integrating traditional games because traditional games have a complete physics concept. Traditional games can develop a variety of moral values in students. Through integration of traditional games into distance learning physics, it increases students’ enthusiasm in following this learning. Students are helped in making decisions. Besides, some students suggested distance learning physics should not only be integrated into traditional games but integrated into local potential and daily life activities.

*The Students Moral Development Level in Physics Learning Based on Traditional Games*

The implementation of distance learning physics during Covid-19 pandemic not only affects development of intelligence but affects students’ moral development. It is as described by t physics teacher in previous section that some students are self-interested and show bad emotional management. One of the causes of this is lack of social interaction between students, teachers, and the environment. Furthermore, to strengthen the findings of students’ moral development, this research conducted interviews with students. Interviews were conducted by asking about their experiences in distance learning physics based on traditional games and face-to-face learning. SFA said that “I took distance learning physics during Covid-19 pandemic. My teacher teaches physics concepts integrated into traditional games. I still follow physics lessons. The reason is that if I don't take distance learning physics, then I won't go up to class”. Based on this statement, SFA is at the second level of moral development. This is indicated by willingness to take part in distance learning physics based on traditional games to move up the class. The statement submitted by SFA is not much different from statement submitted by the SWA. SWA said that “My teacher made various innovations in distance learning physics including integrating it into traditional games. I am still excited about participating in the lesson with the hope that I can get good grades”. Based on this statement, SWA is at the second level of moral development. This is indicated by willingness to take part in distance learning physics based on traditional games to get good grades.



**Figure 2.** Strategies of physics learning based on traditional game

Furthermore, the two students are at second level of moral development which is indicated by statement that students are more concerned with personal interests than shared interests.

Other students gave different responses to questions about distance and face-to-face physics learning. Some students are more excited when learning physics distance and vice versa. This is like an argument put forward by SFB, *“In my opinion, distance-learning or face-to-face physics does not reduce essence of learning. If physics learning focuses on students as learning subjects. This is like what my teacher did by integrating traditional games into physics learning, making it easier for me to apply physics concepts”*. Based on this statement, SFB is at the third level of moral development. This is indicated by willingness to take part in distance learning physics based on traditional games because it makes it easier to apply physics concepts both intellectually and contextually. SWB said that *“I am more passionate about face-to-face physics learning than distance learning. Because in face-to-face learning, the teacher guides me directly. However, distance learning physics based on traditional games makes it easier for me to understand physics concept because it is related to phenomena that occur in life”*. Based on this statement, SWB is at the third level of moral development. This is indicated by willingness to take part in distance learning physics based on traditional games because it makes it easier to understand physics concepts. Furthermore, the two students are at third level of moral development as indicated by statement that students are more concerned with mutual interests because they know benefits of these interests.

The students’ moral development is not only at second and third levels, but some students have reached fourth moral development. This was shown by SFC when interviewed by researchers. SFC said that *“I am still excited about taking distance learning physics. The distance learning physics I took was integrated into traditional games. Integrating traditional games into physics learning helps me understand physics concept”*. Based on this statement, SFC is at the fourth level of moral development. This is indicated by willingness to take part in distance learning physics based on traditional games because it makes it easier to understand physics concepts. A similar argument was also made by SWC that, *“I am enthusiastic about taking distance learning physics. Because physics learning is integrated into traditional games, I can learn while playing. I am more flexible in exploring my abilities. Moreover, if I am not enthusiastic and enthusiastic in participating in distance learning physics integrated into traditional games, then I will have difficulty understanding physics concepts which causes me not to go to class”*. Based on this statement, SWC is at the fourth level of moral development. This is indicated by willingness to take part in distance learning physics based

traditional games because it helps in exploring students’ abilities. Furthermore, the two students are at fourth level of moral development as indicated by statement students are more concerned with mutual interests to achieve mutual benefit.

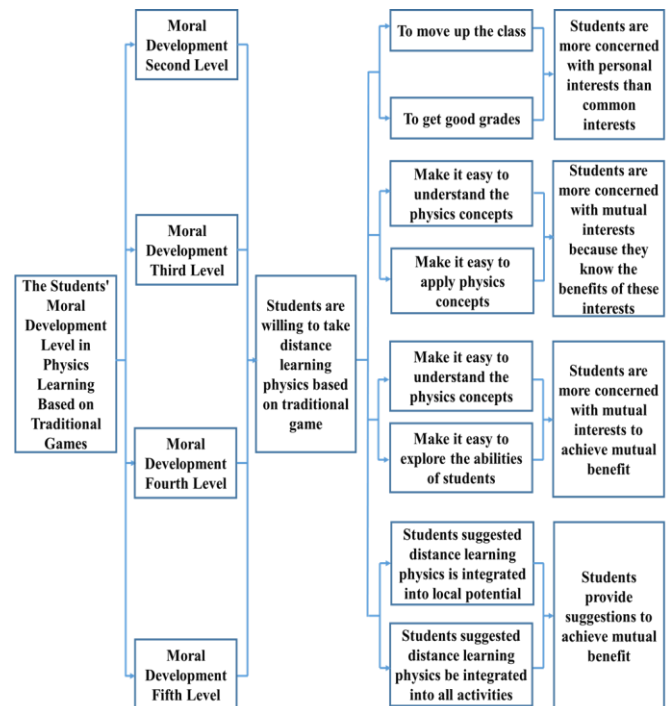


Figure 3. The student’s moral development level in physics learning based on traditional games

Distance learning physics integrated into traditional games was greeted enthusiastically by students. There are even students who suggest distance learning physics is not only integrated into traditional games. This is as stated by SFD that, *“My teacher has innovated distance learning physics by integrating it into traditional games. This is a strategic step to make it easier for us to learn physics concepts. My friends and I also suggested to my teacher to integrate local potential into distance learning physics. This is so that we have many options in applying physics concepts in life”*. Based on this statement, SFD is at the fifth level of moral development. This is indicated by willingness to take part in distance learning physics based on traditional games because it makes it easier to understand physics concepts. Besides, these students suggested that distance learning physics be integrated into local potential. A similar argument was put forward by SWD that, *“I advise my teachers not to just integrate traditional games into distance learning physics. Teachers should do distance learning physics by integrating it into all student activities”*. Based on this statement, SWD is at the fifth level of moral development. This is shown by willingness to take part in distance learning physics based on traditional games and suggests that distance learning physics be integrated into all daily activities.

Furthermore, two students are at the fifth level of moral development which is indicated by students providing suggestions to achieve mutual benefit. Thus, the level of students' moral development in physics learning based on traditional games during Covid-19 pandemic can be arranged into a scheme as shown in Figure 3.

Based on Figure 3, it is shown that students' moral development in distance learning physics based on traditional games is at second, third, fourth, and fifth levels. Meanwhile, students' moral development at the four levels in physics learning can be shown in Table 2.

**Table 2.** Students Moral Development of at the Four Levels in Physics Learning

No.	Name	Moral Development Level	Reason
1.	SFA	Second	To go to class
2.	SWA	Second	To get good grades
3.	SFB	Third	Facilitate the application of physics concepts
4.	SWB	Thirds	Makes it easier to understand the concept of physics
5.	SFC	Fourth	Facilitate understanding of physics concepts
6.	SWC	Fourth	Assist in exploring student abilities
7.	SFD	Fifth	Makes it easy to understand physics concepts and proposes that physics distance learning is integrated with local potential
8.	SWD	Fifth	Suggest that distance learning physics be integrated into all daily activities

The students' moral development at second level is shown by willingness to take part in distance learning physics based on traditional games to move up class and get good grades. This shows that students are more concerned with personal interests than common interests. The students' moral development at third level is shown by willingness to take part in distance learning physics based on traditional games because it easier to understand and apply physics concepts both intellectually and contextually. This shows that students are more concerned with common interests because they know the benefits of these interests. The students' moral development at fourth level is indicated willingness to take part in traditional game-based distance learning physics because it easier to understand physics concepts and helps in exploring students' abilities. This shows that students are more concerned with mutual interests to achieve mutual benefit. The students' moral development at fifth level is indicated by willingness to

take part in traditional game-based distance learning physics and suggests how distance learning physics should be integrated into all daily activities. This shows that students provide suggestions to achieve mutual benefit.

*Discussion*

Face-to-face physics learning was no longer carried out during Covid-19 pandemic and was replaced by distance learning physics. This is because the spread of Covid-19 is increasingly widespread. Therefore, to avoid wider spread of Covid-19, physics learning is carried out remotely. Distance learning physics began to be carried out during Covid-19 pandemic, so teachers and students need to adapt to distance learning mechanisms. In adapting to distance learning mechanism, problems are often found that hinder distance learning physics. The problems found during distance learning physics arise from teachers and students. Teachers and students need a long time to adapt to technology that supports the implementation of distance learning physics. This is due to low technological literacy skills of teachers and students (Dinçer, 2018). Besides, students are accustomed to implementing face-to-face physics learning to complain about implementation of distance learning physics. This happens because students consider physics to be a difficult subject (Bustami et al., 2020). Students who take face-to-face physics learning still have difficulty understanding physics concepts (Erniwati et al., 2020). Students argue that distance learning physics can increase their ignorance of physics concepts and can lead to misconceptions of physics. Besides, there are still some problems that occur in distance learning physics.

Apart from students who complained about distance learning physics, some students were abusing distance learning physics to access prohibited sites. Distance learning physics involves the use of internet-connected technology, so that students can access various sites they want. Students who are in their infancy have a high sense of curiosity about something that challenges them (Ainley, 2019). Besides, students who are in puberty have more interest in opposite sex (Cheng et al., 2020). This causes students to sometimes open pornographic sites during distance learning physics. Students open forbidden sites only to treat their curiosity. Students do not consider actions they do good or bad. Furthermore, distance learning physics during Covid-19 pandemic was carried out independently in homes of each student resulting in students not being able to socialize with friends, teachers, and their environment. Even though the goal is to prevent Covid-19 infection, lack of socialization can hurt students' moral development. The students' moral development is influenced by interactions with students' social



environment (Trolan et al., 2016). Students need to face various life dynamics to optimize their moral development (Margoni et al., 2016).

Distance learning physics during Covid-19 weakens students' moral development (Arfaoui et al., 2016). Students should be able to solve problems that occur in life, but they are only confined in house. Students are less able to solve problems that occur in life (Argaw et al., 2017). Every solution to problems taken by students often does not consider good and bad of these solutions for common good. Students are more concerned with themselves than common interests. During distance learning physics, many students are more concerned with their interests than their groups. Another reason that causes distance physics learning can weaken students' moral development, namely waning of noble values. Students begin to leave the noble values inherited from previous generations. Students consider noble values passed on by previous generations to be incompatible with today's times. Therefore, to optimize students' moral development during Covid-19 pandemic, distance learning physics is integrated into traditional games. One of the reasons traditional games are integrated into distance learning physics is that it is easier for students to understand physics concepts. Traditional games can develop moral values including students' emotional management (Din et al., 2018).

Through the integration of traditional games into physics learning, it encourages students to learn physics concepts. Furthermore, the moral development shown by students in distance learning physics based on traditional games is at second to fifth levels. This shows that students' moral development is at initial conventional and post-conventional stages. High school students have entered their teens, so that their moral development is at conventional stage (Nucci, 2016). Students involved in this research were not at the first stage of moral development because students had entered their teens. There are no students at the sixth level of moral development. This is because sixth moral development is difficult to achieve and sustain a person continuously. The sixth moral development can only be achieved by a few people who prioritize interests of society over personal interests (Krek et al., 2019). Furthermore, students who are at the second level of moral development are willing to take distance learning physics to move up class and get good grades. This shows that students are more selfish.

Students who are at the third level of moral development are willing to take distance learning physics. The reason students are willing to take traditional game-based physics learning is that it makes it easier to understand and apply physics concepts both intellectually and contextually. This shows that students are more concerned with common interests because they

know the benefits of these interests. Students who are at third level of moral development can receive approval or disapproval from others because this reflects society's approval of role they have (Ovcharova, 2020). Students try to be good for people to meet these expectations. This is done because students already know the benefits of these actions. Moral development at third level assesses morality of actions by evaluating consequences in form of interpersonal relationships (Woolfolk, 2015). Meanwhile, students who are at fourth level of moral development are willing to take part in distance learning physics based on traditional games because it makes it easier to understand physics concepts and helps in exploring students' abilities. This shows students are more concerned with mutual interests to achieve mutual benefit.

Students who are at fourth stage of moral development can comply with laws, decisions, and social conventions because they are useful in maintaining community functions (Coquyt, 2020). Thus, moral reasoning in the fourth stage emphasizes needs of society which must exceed personal needs. Students who are in the fifth stage of moral development are willing to take part in distance learning physics based on traditional games and suggest that distance learning physics be integrated into local potential and all daily activities. This shows that students provide suggestions to achieve mutual benefit. At the fifth stage of moral development, students are seen to have different opinions and values. Besides, students need to be respected and valued impartially (Khishfe et al., 2017). Laws can be seen as social contracts and not as rigid decisions. The rules that do not favor social welfare must be changed to fulfill common interests (Mathes, 2019). Thus, the fifth stage of moral development allows deliberation to solve problems.

## Conclusion

This research showed that physics learning strategies in high schools during Covid-19 pandemic were carried out by integrating them into traditional games and implementing a learner-centered learning model. Distance learning strategies are carried out by practicing adapting to technologies that support distance learning physics. Besides, traditional games can develop a variety of moral values in students. The students' moral development in distance learning physics based on traditional games is at second, third, fourth, and fifth levels. Moral development at the second, third, fourth and fifth levels sequentially is shown by the willingness to take part in physics lessons to move up grades, facilitate the application of physics concepts, explore abilities, and integrate physics learning into daily activities. Meanwhile, the

contribution of this research is that learning physics can optimize students' moral development if it is integrated into traditional games.

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#### Conflicts of Interest

The authors declare no conflict of interest.

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